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Re application of: **Czaja, et al.**

Serial No.: **10/056,819** Group Art Unit: **2687**

Filed: **January 24, 2002** Examiner: **Phan, Huy Q.**

For: **Method and Apparatus for Performing Cell Selection Handoffs in a Wireless Communication System**

In accordance with 37 C.F.R. 1.8, I, Barbara S. Kelly, hereby certify that this correspondence and all its attachments are being deposited on Friday, August 5, 2005 with the U.S. Postal Service with sufficient postage as First Class mail in an envelope addressed to Mail Stop RCE, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Barbara Kelly 8/5/05
Barbara S. Kelly August 5, 2005

Mail Stop RCE
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REQUEST FOR CONTINUED EXAMINATION TRANSMITTAL LETTER

Transmitted herewith is a Request for Continued Examination Transmittal, 1 page in duplicate. Also:

(XX) A photocopy of Amendment filed on June 15, 2005, 18 pages.

(XX) Petition for Extension of Time Under 37 CFR 1.136(a)(1), 1 page in duplicate.

(XX) A USPTO Credit Card Payment Form, authorizing the RCE Filing Fee and extension fee in the amount of **$910.**

(XX) The Commissioner is hereby authorized to charge payment of any additional filing fees required under 37 CFR 1.16 including fees for presentation of extra claims and additional patent application processing fees under 37 CFR 1.17 and under 37 CFR 1.20(d) to Deposit Account No. 50-0490.

Date: 8-5-2005
August 5, 2005

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VIA-013-PAP (formerly LSI-008-PAP)

Reply Date: June 15th, 2005
Reply to Final Office Action of April 5th, 2005

In re application of: **Czaja, et al.**

Office Action Confirmation No. 3400

Serial No.: **10/056,819**

Group Art Unit: **2687**

Filed: **January 24, 2002**

Examiner: **Huy Q. Phan**

For: **Method and Apparatus for Performing Cell Selection Handoffs in a Wireless Communication System**

In accordance with 37 C.F.R. 1.8, I, Martin J. Jaquez, hereby certify that this correspondence and all its attachments are being deposited on **Wednesday, June 15th, 2005** with the U.S. Postal Service with sufficient postage as First Class mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

6-15-05

Martin J. Jaquez – Reg. No. 36,060 – June 15th, 2005

Mail Stop AF
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AMENDMENT

Dear Sir:

This paper responds within three months of the April 5th, 2005 mailing date of an Office Action finally rejecting the subject application ("the current Final Office Action"). The amendment does not increase the number of either independent or total claims, so no excess claim fees are due and an excess claim calculation sheet is not attached. Please amend the claims as proposed below, and consider the subsequent remarks.

Amendment to the Claims are reflected in the listing of claims which begin on page 2 of this paper.

Remarks begin on page 8 of this paper.

Amendments to the claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method of performing cell selection handoffs in a wireless communication system, wherein the wireless communication system includes a plurality of base stations in communication with a mobile station (MS), wherein the base stations transmit information to the mobile station via a forward link, and wherein the base stations receive information from the mobile station via a reverse link, and wherein each base station is capable of gating off transmissions for selected time intervals, and wherein the mobile station is capable of determining a strongest base station, and wherein the MS has an associated and corresponding active set of base stations comprising base stations with which the MS currently communicates, and wherein the communication system is capable of performing soft handoffs, comprising the steps of:

a) determining a desired set of base stations, ~~based upon~~ wherein the determining step comprises:

(i) obtaining a threshold parameter based upon receiver needs for proper reception, ~~and~~ wherein the threshold is dependent upon a minimum of MS received power that is necessary to achieve a desired Quality of Service (QoS) for the MS,

(ii) determining relative base station signal strength for each base station in the active set, and

(iii) selecting a minimum number of relatively strong base stations from the active set required to provide the minimum of MS received power to the MS, wherein a combined signal strength of the selected strong base stations are compared with the threshold, and wherein additional strong base stations are selected from the active set until the combined signal strength exceeds the threshold

~~(ii) comparing a sum of one or more base station signal strengths to the threshold parameter~~;

b) temporarily gating off ~~selected base stations based on the desired set of base stations that was~~ all base stations except for the desired set of base stations determined during step (a) for a selected time interval; and

c) performing a soft handoff.

2. (Currently amended) The method of performing cell selection handoffs as defined in Claim 1, wherein the ~~step (a) comprises determining a set of strong base stations within a mobile station active set~~ selected time interval comprises a Power Control Group (PCG) time slot.

3. (Currently amended) The method of performing cell selection handoffs as defined in Claim 1, wherein the step (a) ~~comprises~~ includes determining a set of strong base stations on a Power Control Group ("PCG") basis.

4. (Currently amended) The method of performing cell selection handoffs as defined in Claim 1, wherein the ~~step (b) comprises gating off all base stations except for the desired set of base stations~~ selected time interval comprises approximately 1.25 milliseconds.

5. (Currently amended) The method of performing cell selection handoffs as defined in Claim 1, wherein the step (a) ~~comprises~~ includes the following sub-steps:

i) measuring carrier-to-interference ratios of all of the base stations in ~~a mobile station~~ the active set; and

ii) selecting a base station having a best signal to noise (E_b/N_t) to achieve ~~a specified~~ the desired QoS to be a ~~chosen~~ selected base station of the desired set of base stations.

6. (Original) The method of performing cell selection handoffs as defined in Claim 1, wherein the step (a) is performed by a mobile station.

7. (Currently amended) The method of performing cell selection handoffs as defined in Claim 1, wherein the step (a) ~~comprises~~ includes the following sub-steps:

i) measuring a plurality of received pilot E_c/I_o values that represents a pilot E_c/I_o for each pilot in ~~a~~ the mobile station active set;

ii) averaging the plurality of received pilot E_c/I_o values; and

iii) selecting a base station having a best pilot E_c/I_o value to be a ~~chosen~~ selected base station of the desired set of base stations.

8. (Original) The method of performing cell selection handoffs as defined in Claim 7, wherein the averaging sub-step (ii) is implemented by hardware.

9. (Original) The method of performing cell selection handoffs as defined in Claim 7, wherein the averaging sub-step (ii) is implemented by software.

10. (Original) The method of performing cell selection handoffs as defined in Claim 7, wherein the averaging sub-step (ii) is performed by a filter.

11. (Original) The method of performing cell selection handoffs as defined in Claim 10, wherein the averaging sub-step (ii) is performed by an IIR filter.

12. (Original) The method of performing cell selection handoffs as defined in Claim 10, wherein the averaging sub-step (ii) is performed by an FIR filter.

13. (Currently amended) The method of performing cell selection handoffs as defined in Claim 1, wherein the step (b) comprises transmitting a gate off message to all base stations in ~~a~~ the mobile station active set except for the desired set of base stations.

14. (Currently amended) The method of performing cell selection handoffs as defined in Claim ~~1~~ 13, wherein the gate off message is transmitted via a feedback channel.

15. (Previously presented) The method of performing cell selection handoffs as defined in Claim 14, wherein the feedback channel has a length of one to several Power Control Groups ("PCGs").

16. (Original) The method of performing cell selection handoffs as defined in Claim 14, wherein the feedback channel has a rate ranging between 200 Hz and 1600 Hz.

17. (Currently amended) The method of performing cell selection handoffs as defined in Claim 1, wherein the step (a) comprises the following sub-steps:

i) continuously determining channel condition estimate for each base station in ~~a~~ the mobile station active set;

ii) continuously sorting the channel condition estimates by strength; and

iii) continuously determining whether a strongest channel condition estimate is greater than the threshold parameter.

18. (Original) The method of performing cell selection handoffs as defined in Claim 17, wherein the determining sub-step (i) utilizes a sum of all usable multipath signals to estimate channel conditions.

19. (Original) The method of performing cell selection handoffs as defined in Claim 17, wherein the estimating sub-step (i) averages the continuous channel condition estimate during uncertainty periods.

20. (Original) The method of performing cell selection handoffs as defined in Claim 17, wherein the threshold parameter of the determining sub-step (iii) is defined by the following equation:

$T\_QOS\_dB = FPC\_FCH\_SETPT + \Delta\chi$.

21. (Original) The method of performing cell selection handoffs as defined in Claim 20, wherein the determining sub-step (iii) further comprises selecting additional continuous channel condition estimates until a combination of strong continuous channel condition estimates is greater than the threshold parameter.

22. (Currently amended) The method of performing cell selection handoffs as defined in Claim 20, wherein the determining sub-step (iii) further comprises selecting additional continuous channel condition estimates until SUM_PILOTS > T_QOS_dB occurs, where SUM_PILOTS is a combined received power from all received pilots from a desired set of base stations in ~~a~~ the mobile station active set.

23. (Previously presented) The method of performing cell selection handoffs as defined in Claim 1, wherein the step (b) comprises the following sub-steps:

i) selecting a desired set of base stations to transmit during a Power Control Group ("PCG") PCG_{N+2}; and

ii) gating off all remaining BSs in the active set.

24. (Currently amended) Apparatus for performing cell selection handoff functions in a wireless communication system, wherein the wireless communication system includes a plurality of base stations in communication with a mobile station (MS), wherein the base stations transmit information to the mobile station via a forward link, and wherein the base stations receive information from the mobile station via a reverse link, and wherein each base station is capable of gating off transmissions for selected time intervals, and wherein the mobile station is capable of determining a strongest base station, and wherein the MS has an associated and corresponding active set of base stations comprising base stations with which the MS currently communicates, and wherein the communication system is capable of performing soft handoffs, comprising:

a) a base station selection module configured to determine a desired set of base stations by comparing a sum of strengths of one or more base station signals received by the mobile station to a threshold parameter, the threshold parameter being based upon requirements for proper reception by the mobile

station, wherein the threshold is dependent upon a minimum of MS received power that is necessary to achieve a desired Quality of Service (QoS) for the MS, and wherein the selection module selects a minimum number of relatively strong base stations from the MS active set required to provide the minimum of MS received power to the MS;

b) a forward link instruction module configured to prepare instructions for temporarily gating off selected base stations for a selected time interval based on the desired set of base stations ~~that was~~ determined by the base station selection module; and

c) a soft handoff control module configured to enable, after temporarily gating off the selected base stations, performance of the cell selection soft handoff functions.

25. (Currently amended) A computer program executable on a computing device, wherein the program is capable of directing performance of cell selection handoff functions in a wireless communication system, wherein the wireless communication system includes a plurality of base stations in communication with a mobile station, wherein the base stations transmit information to the mobile station via a forward link, and wherein the base stations receive information from the mobile station via a reverse link, and wherein each base station is capable of gating off transmissions for selected time intervals, and wherein the mobile station is capable of determining a strongest base station, and wherein the MS has an associated and corresponding active set of base stations comprising base stations with which the MS currently communicates, and wherein the communication system is capable of performing soft handoffs, comprising:

a) a first set of instructions for determining a desired set of base stations by comparing a sum of strengths of one or more base station signals received by the mobile station to a threshold parameter, the threshold parameter being based upon requirements for proper reception by the mobile station, and wherein the threshold is dependent upon a minimum of MS received power necessary to achieve a desired Quality of Service (QoS) for the MS, and wherein the desired set comprises a minimum number of relatively strong base stations from the MS active set having a combined received signal strength that exceeds the threshold;

b) a second set of instructions for temporarily gating off ~~selected base stations based on the desired set of base stations that was determined using the first set of instructions~~ all base stations except for the desired set of base stations for a selected time interval; and

c) a third set of instructions for directing performance of soft handoff functions after completion of the first and second sets of instructions.

26. (Currently amended) The method of Claim 1, wherein the ~~threshold parameter is based upon a quality of service ("QoS") associated with the mobile station~~ desired set of base stations comprises only one base station.

27. (Currently amended) The method of Claim ~~26~~ 14, wherein the ~~sum of base station signal strengths is a sum of signal strengths from the desired set of base stations, and the sum is at least as great as the threshold parameter~~ feedback channel comprises a low latency feedback channel having relatively short transmission delays.

REMARKS

Prior to this response, Claims 1-27 were pending in the subject application, including independent Claims 1, 24 and 25. By entry of the present Amendment, Claims 1-5, 7, 13, 14, 17, 22, and 24-27 are hereby amended as set forth in the listing of the claims above. Therefore, after entry of the present Amendment, Claims 1-27 are pending in the present application. The Examiner is respectfully requested to enter the current amendment set forth above as placing the application in better condition for appeal, or as overcoming the Examiner's grounds for rejection and placing the application in condition for allowance.

Amendments to the Claims

No new matter is added by the present amendment. Support for the amendments to independent Claims 1, 24 and 25 may be found throughout Applicants' specification. For example, support for the amendments to independent Claims 1, 24 and 25 is found at page 13, lines 5-22, page 14, lines 11-17, as well as in FIGURE 3 and the accompanying text, particularly from page 16, line 27, to page 17, line 18. Further support for these amendments is found in Applicants' specification at page 12, lines 21-30, and at page 15, lines 4-18. Amendment including the term "MS" further defining the term "mobile station" is not for reasons related to patentability, but merely simplifies the language required to refer to a mobile station.

Independent Claims 24 and 25 are amended in a manner similar to Claim 1, and these amendments are therefore similarly supported by Applicants' specification as set forth above. Further support for the amendments to independent Claims 24 and 25 is provided by FIGURE 4 and the accompanying text, particularly at page 19, lines 1-29 of Applicants' specification.

Dependent Claim 2 has been amended to ensure consistency with amended Claim 1, and to further define the "selected time interval" during which selected base stations are temporarily gated off in some embodiments. Support for this amendment is found in Applicants' specification and originally filed claims. Specifically, support is found at page 12, lines 21-30, page 13, lines 5-23, page 15, lines 20-24, page 17, and lines 21-26. Support for the amendment to Claim 2 can also be found in Claims 13-15 and Claim 23 as originally filed.

Dependent Claim 4 has been amended to ensure consistency with amended Claim 1, and to further define that the "selected time interval" comprises approximately 1.25 milliseconds in some embodiments of Applicants' inventive method. Support for this amendment is found, for example, in Applicants' specification at page 12, lines 21-26, and at page 19, lines 1-12 (and FIGURE 4 and accompanying text).

Dependent Claims 3, 5, 7, 13, 14, 17 and 22 are amended to ensure consistency with amended Claim 1 and to correct minor informalities. No new matter is added by these amendments. The amendments to these claims do not change their meaning or scope, and they therefore are self-supporting. Claim 14 has also been amended herein to correct a minor informality (to properly depend from Claim 13, instead of depending from Claim 1).

The subject matter previously set forth in dependent Claims 2, 4, 26-27, and deleted by this amendment, has been incorporated into amended Claim 1. These amendments to Claim 1 are therefore supported by these claims as originally filed.

Dependent Claim 26 has been further amended to clarify that, in one embodiment of Applicants' method, the desired set of base stations comprises only one base station. Support for this amendment is found in Applicants' specification at page 15, lines 4-11, and at page 16, line 27 through page 17, line 12 (describing the flowchart shown in FIGURE 3).

Finally, dependent Claim 27 has been further amended to clarify that, in one embodiment of Applicants' method, the feedback channel comprises a low latency (*i.e.*, short transmission delays) feedback channel. Support for this amendment can be found in Applicants' specification at page 15, line 29 through page 16, line 2, and at page 18, lines 1-9.

No new matter is presented by this amendment.

Rejections under 35 USC § 103

In section 4 of the current Final Office Action, the Examiner rejects Claims 1-9, 13 and 24-27 as unpatentable over U.S. Patent 6,628,958 to Kamel et al. (Kamel) in view of U.S. Patent 6,151,502 to Padovani et al. (Padovani). It is respectfully submitted that each of the independent claims, as presently amended, recites features that are neither anticipated by Kamel, nor obvious in view of Padovani, whether alone or further in view of both U.S. Pat. App. Publication US-2001/0019541 to Jou et al. (Jou) or U.S. Patent 6,307,849 to Tiedemann Jr. ("Tiedemann"), together, "the cited prior art". Consequently, each of the dependent claims are also rendered nonobvious over any combination of the cited prior art, at least by virtue of properly depending from a nonobvious claim.

As compared to Applicants' method defined, for example, in Claim 1 as currently amended, Padovani teaches a very different approach in determining which base stations ("BSs") to disable or "gate off" when performing soft handoff procedures. More specifically, both the method (process used to manipulate the MS

active set) and threshold value taught by Padovani in determining which BSs to gate off during soft handoffs differ significantly from Applicants' cell section method and apparatus. The Padovani method teaches a technique for adding or dropping BSs from the MS active set (*i.e.*, Padovani teaches a method and apparatus for managing or manipulating the list of BSs in the MS active set). Thus, the Padovani method continuously revises the active set based on a sum of BS pilot signal energies. As described in more detail below, the Padovani method bases this determination on a threshold that differs significantly from the threshold taught by Applicants. Furthermore, once a BS is dropped from the active set, Padovani teaches permanently disabling (or gating off) the BS from the MS until and unless it is once again added to the MS active set.

In contrast to Padovani which teaches manipulation of the list of BSs in the MS active set, Applicants' inventive approach leaves the active set entirely unaffected. Applicants' method and apparatus does not revise or affect the active set in any manner whatsoever. Rather, Applicants' method and apparatus, as defined in the amended claims and described in Applicants' specification, merely uses the active set as a starting point, from which a determination is made as to which BSs to temporarily gate off (and which to enable) when performing a soft handoff procedure. As set forth in amended Claim 1, for example, Applicants determine a "desired set of base stations" by selecting a minimum number of relatively strong base stations from the active set required to provide a minimum of MS received power. Once the list of BSs in the "desired set" (*i.e.*, as distinguished from the "active set") is determined, the BSs of all other BSs (*i.e.*, those not listed in the desired set) are temporarily gated off for a selected time interval. Therefore, as set forth in the claims and described in Applicants' specification, the active set is not revised using Applicants' approach. However, the list of BSs to enable (*i.e.*, those included in the desired set) is revised on a regular basis. This difference is significant because it allows for faster response time, less administrative overhead, and better tracking and response to fading conditions as compared to the prior art approaches. Rather than suffer the delays associated with revising the active set, and attempting to reduce interference by updating the active set to drop unnecessary BSs (as would be required if attempted using the Padovani approach), Applicants' inventive approach provides a means for directly disabling unnecessary BSs independent of the active set. Using Applicants' inventive method and apparatus, BSs can be directly disabled by the MS (using a feedback channel), rather than having to achieve the gating off through a Base Station Controller (BSC), for example.

Note further, unlike Padovani, in most cases, not all of the BSs in the active set are enabled using Applicants' inventive method and apparatus. That is, in most cases, the "desired set" comprises a subset of the "active set", and only those BSs listed in the desired set are enabled. All other BSs, including many that are

present in the active set but not present in the "desired set", are gated off using Applicants' inventive technique. This is significant, as the reduction in interference caused by unnecessary BSs (those not included in the desired set, but present in the active set) is greatly reduced using Applicants' approach as compared to Padovani's approach which enables all of the BSs in the active set during soft handoffs. This distinction is described in more detail below.

Further, as noted above, the threshold used by Padovani in determining which BSs to add to or drop from the active set differs significantly from that used by Applicants. The Padovani method, as described at col. 3, lines 42-67, computes a threshold based upon a "COMBINED_PILOT" value. The "COMBINED_PILOT" value comprises a sum of energies of all of the pilot signals currently in an MS' revised active set (P_1, P_2, ... P_{i-1}). The threshold taught by Padovani is computed by performing a linear operation on the "COMBINED_PILOT" value. Specifically, as set forth at col.7, lines 23-53 (and also in the alternative method as described at col. 8, lines 37-41), the threshold is computed in accordance with Equation 1 which reads as follows: T= SOFT_SLOPE * COMBINED_PILOT + SOFT_INTERCEPT. Thus, the threshold "T" taught by Padovani is determined by summing all of the pilot energies of all of the base stations in the revised active set, as modified by the constants "SOFT_SLOPE" and "SOFT_INTERCEPT", in accordance with equation 1.

Importantly, this threshold and base station selection basis taught by Padovani does not consider whether the BS signals that are enabled actually provide sufficient strength to maintain a desired quality of service (QoS) for the MS. As noted in the response to the previous Office Action, Applicants have observed that it is important to determine whether the MS has sufficient signal strength to satisfy a desired QoS. As such, Applicants describe a method by which sufficient BSs are enabled so that the MS receives a sufficiently powerful combined received signal from the enabled BSs. In order to achieve this important goal, Applicants select desired BSs based on a threshold parameter that is, in turn, based upon a minimum of MS received power that is necessary to achieve a desired Quality of Service (QoS) for the MS. This is a starkly different threshold than that of Padovani (*T*), which is based instead on the sum of all of the base station pilot energies in the revised active set.

As noted briefly above, and as set forth in amended Claim 1 (and similarly set forth in amended Claims 24 and 25), Applicants' inventive method enables (or "gates" on) only a minimum number of base stations (in the MS active set) that are necessary to provide the required minimum MS received power to the MS. As noted on page 15, lines 4-11 of Applicants' specification (*see also*, page 6, lines 21-31) enabling only

those BSs that are necessary to achieve a desired Quality of Service (QoS) further reduces interference when performing soft handoff procedures. As set forth in amended Claim 1, the minimum number of BSs selected for enablement (*i.e.*, those that are placed into the desired set of base stations and gated on in step (c)) comprises only those base stations whose combined received signal strength exceeds the threshold. Applicants' inventive method therefore advantageously does not enable all of the BSs in the MS active set (as does Padovani), but rather, it enables only a minimum number of relatively strong BSs. The minimum number of strong BSs is enabled in order to provide a combined signal strength to the MS that exceeds the threshold. This, in turn, provides a minimum of MS received power that is necessary to achieve a desired Quality of Service (QoS) for the MS.

Nowhere does Padovani (or any of the other cited art, for that matter) teach or suggest determining whether to gate BSs off (or leave them transmitting) based upon a threshold that is dependent upon a minimum of MS received power necessary to achieve a desired (or required) QoS. Nor does Padovani teach or suggest gating on a minimum number of BSs sufficient to provide a combined receive signal strength to the MS necessary to achieve a desired QoS. Rather, as described above, Padovani merely determines whether to add (or drop) a base station to an active set based upon the variable "COMBINED_PILOT". Once all BSs have been added to (or dropped from) the active set, all of the BSs in the active set are enabled by Padovani without regard to whether they are all required to satisfy a desired MS QoS. By enabling only those BSs necessary to satisfy a minimum of MS receive power necessary to achieve a desired QoS (*i.e.*, only those BSs selected for the "desired set"), rather than simply enabling all of the BSs in the active set (as per Padovani), a significant reduction in interference is achieved when performing a soft handoff using Applicants' inventive method and apparatus than is achievable in the cited prior art.

Further, as noted above, once a BS is deleted from the list of BSs in the active set, Padovani teaches permanently disabling (or gating off) the BS from the MS until and unless it is once again added to the MS active set. That is, assuming, *arguendo*, that Padovani teaches reducing interference during soft handoffs by deleting BSs from the active set and thereby "gating off" the deleted BSs, such gating off is permanent in the sense that the deleted BS will remain disabled until and unless it is once again added to the active set. This is vastly different from Applicants' inventive method and apparatus as described in Applicants' specification, and as set forth in the amended claims.

For example, Claim 1 has been amended to clarify that step (b) comprises temporarily gating off all base stations except for the desired set of base stations determined during step (a) for a selected time interval.

Independent Claims 24 and 25 have been similarly amended. Dependent Claim 2 has been amended to define that in some embodiments, the selected time interval comprises a PCG time slot. As described at page 12, lines 21-30, and as set forth in amended Claim 4, the selected time interval (*e.g.*, PCG) may be relatively short, in some cases approximately 1.25 milliseconds. In stark contrast, nowhere does Padovani teach or suggest temporarily gating off the desired set of base stations for a selected time interval, especially time intervals as short in duration as those contemplated by Applicants. Rather, as noted above, if Padovani arguably teaches any interval at all with regard to disabling BSs, it is orders of magnitude longer (2-3 seconds) than that taught by Applicants. In fact, it can be reasonably argued that Padovani teaches "permanently" disabling the BSs, in the sense that the BS is permanently disabled until and unless it is once again added to the active set.

Nor does Kamel cure the above-described deficiencies found in Padovani. Similar to Padovani, Kamel neither teaches nor suggests determining whether to gate BSs off based upon a threshold that is dependent upon a minimum of MS received power necessary to achieve a desired QoS. Rather, Kamel simply teaches transmitting base station power at a first power level if the base station is not participating in a soft handoff procedure, and at a second power level if the base station is participating in a soft handoff procedure. Kamel further teaches adjusting the first and second power levels using "down-step" and "up-step" levels of different magnitudes. However, in stark contrast to Applicants' inventive method and apparatus as set forth in amended Claim 1 (and similarly amended Claims 24-25), nowhere does Kamel teach or suggest basing a selection of a desired set of base stations upon a threshold that is dependent upon a minimum of MS received power to the MS that is necessary to achieve a desired Quality of Service (QoS) for the MS. Nor does Kamel teach or suggest gating off those BSs not included in the desired set of base stations. In fact, Kamel arguably teaches away from disabling the BSs. The system taught by Kamel constantly enables BSs during soft handoff procedures (*i.e.*, BSs participating in a soft handoff procedure transmit at a first power level, while those that do not so participate transmit at another power level).

For the reasons given above, this lack of teaching in Kamel is not compensated even by combining Kamel with Padovani, or any of the other cited art. For example, for the reasons given above, Kamel, either alone, or in combination with the art cited by the Examiner, neither teaches or suggests temporarily gating off selected base stations (those that are unnecessary for providing a minimum of MS received power to the MS necessary to achieve a desired QoS) for a selected time interval. In fact, as described above, Kamel does not teach gating off the base stations for any period of time. Although the Examiner, in rejecting Claim 13 at

page 6 of the Final Office Action, cites Kamel as teaching "transmitting a gate off message to all base stations in a mobile station active set except for the desired set of base stations", Applicants find no support in Kamel for this assertion. Rather, at the section of Kamel indicated by the Examiner (col. 3, line 59 – col. 4, line 16), Kamel teaches that the MS transmits a power control bit to raise or lower power in the forward link. BSs receive the power control bit indicating that they should either increase or decrease power. However, in stark contrast to Applicants' inventive method and apparatus, nowhere does Kamel teach or suggest gating off the BSs. Rather, the power level of the BSs are merely increased or decreased by a step-wise function, however, they are not completely disabled.

Therefore, at least for the reasons set forth above, Applicants' inventive method, as set forth in amended Claim 1, is novel and nonobvious over Padovani in view of Kamel. Nowhere does Kamel, either alone or in combination with Padovani, teach or suggest Applicants' inventive method of performing cell selection handoffs using a threshold that is dependent upon a minimum of MS received power necessary to achieve a desired Quality of Service (QoS) for the MS. Nor does Padovani or Kamel, either alone or together, teach or suggest determining a desired set of BSs using such a threshold, wherein the desired set comprises a minimum number of relatively strong BSs from the active set required to provide the minimum of MS received power to the MS. Nor do any of the cited references, either alone or in combination, teach or suggest temporarily gating off all of the BSs except for the desired set of BSs, for a selected time interval.

Independent Claims 24 and 25 are hereby amended similarly to the amendment of Claim 1. For example, independent Claim 24 has been amended to include a base station selection module that uses a threshold to determine a set of base stations, wherein the threshold is dependent upon a minimum of MS received power that is necessary to achieve a desired Quality of Service (QoS) for the MS, and wherein the selection module selects a minimum number of relatively strong base stations from the MS active set required to provide the minimum of MS received power to the MS. Claim 25 has been similarly amended (*see, e.g.*, the limitation further defining the first set of instructions for determining a desired set of base stations). Therefore, for the reasons set forth above with regard to rejected independent Claim 1, Applicants respectfully submit that independent Claims 24 and 25, as presently amended, define an apparatus (Claim 24) and computer program (Claim 25) that are novel and nonobvious over the cited prior art. Applicants respectfully submit that the rejections of Claims 24 and 25 are hereby overcome.

On pages 4-7, inclusive, of the current Final Office Action, the Examiner rejects dependent Claims 2-9, 13 and 26-27 citing both the Kamel and Padovani references under 35 USC § 103. At least for the reasons

set forth above, and by virtue of properly depending from amended Claim 1, Applicants respectfully submit that the remaining dependent claims (dependent Claims 2-9, 13, and 26-27) are nonobvious over the cited prior art.

In Section 5 of the current Final Office Action, the Examiner rejects Claims 10-12 under 35 USC § 103 as being unpatentable over Kamel and Padovani, and further in view of Jou. However, because Jou does not cure the above-described deficiencies of the Padovani and Kamel references, neither Jou, Kamel nor Padovani, taken alone or in combination, even if such combination could be made, render obvious Applicants' inventive method as set forth in amended Claim 1. Furthermore, at least for the reasons set forth above, and by virtue of properly depending from amended Claim 1, Applicants respectfully submit that dependent claims 10-12 are also nonobvious over the cited prior art.

In Section 6 of the current Final Office Action, the Examiner rejects Claims 14-19 under 35 USC § 103 as being unpatentable over Kamel and Padovani, and further in view of Tiedemann. Similar to Jou, Tiedemann also does not compensate for the above-described shortcomings of Padovani and Kamel, and neither Tiedemann, Kamel nor Padovani, taken alone or in combination with Jou, render obvious Applicants' inventive method as set forth in amended Claim 1.

Further, at least for the reasons set forth above, and by virtue of properly depending from amended Claim 1, Applicants respectfully submit that dependent claims 14-19 are also nonobvious over the cited prior art. Moreover, even assuming, for the sake of argument, that the system taught by Tiedemann could be combined with those of Kamel and Padovani, the latency of the analogous "gate off" message (*i.e.*, the delay measured from the time a decision is made to drop a BS from the active set to the actual gating off of the BS) in Padovani is approximately three orders of magnitude longer than the latency of the gate off message taught by the Applicants, and set forth in amended Claims 13-14, previously presented Claim 15, original Claim 16, and amended Claim 27. For example, amended Claim 14 defines that in some embodiments the gate off message is transmitted via a feedback channel, and previously presented Claim 15 defines that the feedback channel has a duration of one or more PCGs in some embodiments. Amended Claim 27 further defines the feedback channel as having low latency and relatively short transmission delays in some embodiments. In very sharp contrast, the system of Padovani takes considerably longer to "gate off" a BS based upon an analogous "gating off" message received from an MS. Presumably, such an analogous gating off message is achieved, in the Examiner's characterization, by determining first whether to drop a BS from the active set,

and then transmitting such a message to the BSC. This gate message latency is substantially longer (on the order of 2-3 seconds) than that taught by the Applicants, and set forth in the amended Claims.

Also, as noted above, Kamel does not teach, and arguably teaches away from, gating off (*i.e.*, disabling) base stations. Therefore, it is difficult to see how the system of Kamel could be combined with the teachings of Tiedemann and Padovani to render obvious Applicants' inventive method as set forth in dependent claims 14-19 as currently amended. It is similarly difficult, for these reasons, to find any suggestion or motivation to combine these references in the manner suggested by the Examiner. Perhaps it is only possible through the impermissible hindsight of Applicants' specification that such a combination can be made, if at all.

In Section 7, the Examiner states that Claims 20-23 are objected to as being dependent upon a rejected base claim (Claim 1). The Examiner states that Claims 20-23 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants appreciate the Examiner's observation that the cited prior art fails to teach or suggest use of the threshold parameter "T_QoS_db" as described in Applicants' specification and set forth in original Claim 20, and as further defined in Claims 21-23. As described at page 16, line 27 through page 17, line 9 of Applicants' specification, in one exemplary embodiment of Applicants' inventive cell selection method, a threshold is used that identifies the "target of quality of service measured in dB units". In this exemplary embodiment, the threshold is defined as a level of SNR that can achieve a desired or required QoS. The threshold parameter depends on both a "forward power control fundamental channel set point" and a parameter that is dependent upon the processing gain of the data channel, coding rates, FPC accumulated gain and similar variables.

The exemplary "T_QoS_db" threshold is exemplary of the broader threshold described in Applicants' specification and set forth in amended Claims 1, 24 and 25, namely, a threshold that is based upon receiver needs for proper reception, wherein the threshold is dependent upon a minimum of MS received power necessary to achieve a desired Quality of Service (QoS) for the MS. In this example, the threshold "T_QoS_db" identifies the target quality of service for the MS. As shown in FIGURE 3 and as described in the accompanying text, this threshold is used to determine which BSs to enable during soft handoffs. In the exemplary method, strong BSs are selected from the active set, one at a time, and compared with the novel threshold. If the BS signal strength exceeds the threshold, it (and only it) is enabled during the soft handoff, else, the selected BS is included in the desired set of base stations, and the next strong BS is selected from the active set. The process continues to select BSs from the active set for inclusion in the desired set until the

combined signal strength of all BSs (*i.e.*, "SUM_PILOTS") exceeds the threshold. In this manner, only those BSs in the MS active set necessary to generate a combined signal strength (and thereby ensuring a minimum of MS received power necessary to achieve the desired QoS) are enabled. All other BSs, including all other BSs in the active set (including other strong BSs) are disabled. Furthermore, the active set remains unchanged. As described above, none of the cited prior art teach or suggest such an inventive threshold, nor do they teach or suggest Applicants' inventive method and apparatus for performing cell selection handoffs as set forth in the amended claims. For these reasons Applicants respectfully submit that all of the claims, not only Claims 20-23, are now in condition for prompt allowance.

Conclusion

The remarks set forth above support a conclusion that the amendments proposed herein overcome the Examiner's grounds for rejection, thereby rendering each independent claim nonobvious over the cited prior art. Accordingly, each dependent claim is also nonobvious over the cited prior art, at least by virtue of properly depending from one of the novel and nonobvious independent Claims 1, 24 or 25. As such, the proposed amendments are believed to place the subject application into condition for allowance. The Examiner is therefore respectfully requested to enter the proposed amendments as placing the application into condition for allowance, and to issue a notice of allowability in due course. If the Examiner declines to enter the proposed amendment as placing the application into condition for allowance, then he is respectfully requested to enter the proposed amendment to place the application into better condition for appeal.

If telephonic communication might be advantageous to resolve any remaining issues, the Examiner is encouraged to contact the undersigned by telephone.

The Commissioner is authorized to construe this paper as including a petition to extend the period for response by the number of months necessary to make this paper timely filed. Fees or deficiencies required to cause the response to be complete and timely filed may be charged, and any overpayments should be credited, to our Deposit Account No. **50-0490**.

Respectfully submitted,

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Date: June 15, 2005

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